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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/561,318	05/15/2006	Rainer Butendeich	12406-141US1 P2003,0404US	2803
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EXAMINER				
KALAM, ABUL				
ART UNIT		PAPER NUMBER		
2814				
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

PATDOCTC@fr.com

Office Action Summary

Application No.

10/561,318

Applicant(s)

BUTENDEICH ET AL.

Examiner

Abul Kalam

Art Unit

2814

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 December 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1, 5-14, 17 and 19-21 is/are pending in the application.
- 4a) Of the above claim(s) 5-7, 9 and 19 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 8, 10-14, 17 and 20 is/are rejected.
- 7) ☒ Claim(s) 21 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB08)
Paper No(s)/Mail Date 8/26/08
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Claim Status

1. Claims 1, 5-14, 17 and 19-21 are currently pending, with claims 5-7, 9, and 19 being previously withdrawn.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

2. **Claims 1, 12-14 and 17** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Nakatsu (US 6,081,540; previously cited)** in view of **Shakuda (US 5,825,052; cited by Applicant)**.

With respect to **claim 1**, **Nakatsu** teaches (**FIG. 3**) a radiation-emitting semiconductor component with a layer structure comprising:

- an n-doped confinement layer (**12 and 13, Fig. 3**) with a first n-dopant (**col. 7, ln. 65: Si doped clad layer**),
- a p-doped confinement layer (**15, Fig. 3**), and
- an active layer, photon emitting layer (**14, Fig. 3**) disposed between said n-doped confinement layer (**13**) and said p-doped confinement layer (**15**), and doped with a

second n-dopant (**col. 7, Ins. 66-67: Se doped active layer**) different from the first n-dopant (**Si**), and

wherein at least one layer of the layer structure is formed of a material selected from the group consisting of AlGaInP, AlGaAs, InGaAlAs or InGaAsP (**col. 8, Ins. 61-67**).

Thus, Nakatsu discloses all the limitations of the claim with the exception of explicitly disclosing wherein said n-doped confinement layer further includes the second n-dopant or an additional n-dopant.

However, **Shakuda** discloses a radiation-emitting semiconductor component with an n-doped confinement layer (**3 and 4, Fig. 5**) including first and second n-type dopants (**col. 8, Ins. 24-46**). Therefore, it would have been obvious to one of ordinary skill in the art, at the time of the invention, to incorporate the teaching of **Shakuda** into the invention of Nakatsu, to form a confinement layer having two kinds of dopants, for the disclosed intended purpose of improving the light emitting efficiency of the device (**Shakuda: col. 8, Ins. 39-42**).

With respect to **claim 12**, **Nakatsu** teaches wherein said first n-dopant comprises silicon (**col. 7: Ins. 62-67**).

With respect to **claim 13**, **Nakatsu** teaches wherein said second n-dopant tellurium (**col. 9: Ins. 22-24**).

With respect to **claim 14**, **Nakatsu** teaches wherein said p-doped confinement (**15**) layer comprises zinc (**col. 7: Ins. 62-67 and col. 8: Ins. 1-6**).

With respect to **claim 17, Shakuda** teaches wherein the additional dopant is said second n-dopant (**Se, col. 8, Ins. 2—26**).

3. **Claims 8, 10, 11 and 20** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Nakatsu (6,081,540)** and **Shakuda ('052)**, and further in view of **Anayama (US 2002/0027935; previously cited)**.

With respect to **claim 8, Nakatsu and Shakuda** teach all the limitations of the claim, as set forth above in claim 1, with the exception of disclosing: wherein said semiconductor component is a laser diode in which a first waveguide layer is disposed between said active layer and said n-doped confinement layer and a second waveguide layer is disposed between said active layer and said p-doped confinement layer.

However, **Anayama** teaches a laser diode (**FIG. 15J**) in which a first waveguide layer (**58, 59; pgs. 7-8: ¶ [0131]-[0132]**) is disposed between said active layer (**60; pg. 8: ¶ [0135]**) and said n-doped confinement layer (**54-57; pg. 7: ¶ [0125]**) and a second waveguide layer (**61, 62; pg. 8: ¶ [0136]-[0137]**) is disposed between said active (**60**) layer and said p-doped confinement layer (**63-65; pg. 8: ¶ [0138]**).

With respect to **claims 10 and 20, Nakatsu, Shakuda and Anayama** teach all the limitations of the claims, as set forth above in claims 1 and 8, with the exception of disclosing wherein said first waveguide layer is doped with said second n-dopant. However, **Nakatsu** teaches wherein the active layer is doped with a second n-dopant of selenium (**col. 7, Ins. 66-67**) and **Anayama** teaches wherein the first waveguide layer is doped with silicon ("**dopant gas of Si₂H₆**", **pgs. 7-8: ¶ [0131]**). It would have been

obvious to one of ordinary skill in the art at the time of the invention, to dope the first waveguide layer with selenium instead of silicon, because such a modification would have been considered a mere substitution of art recognized equivalent dopants **(Shakuda: col. 8, Ins. 24-25)**.

With respect to **claim 11**, **Anayama** teaches wherein the second waveguide layer **(61)** is un-doped **(pg. 8: [0136])**.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to combine the teaching of Anayama, with the teachings of Nakatsu and Shakuda, to form waveguide layers interposed between n-doped and p-doped confinement layers and the active layer, for the purpose of forming a laser diode capable of operating for a long duration without losing efficiency **(Anayama: pg. 10, ¶ [0154])**. Furthermore, note that Shakuda states that his "invention can be also applied to various semiconductors including semiconductor laser (col. 11, Ins. 54-55)."

Allowable Subject Matter

4. Claim 21 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Regarding claim 21, the prior art of record neither anticipates nor renders obvious all the limitations of the claim: including the first waveguide layer comprising a single layer doped with the second n-dopant and adjoining the active layer.

Response to Arguments

5. Applicant's arguments filed December 22, 2008, have been fully considered but are moot in view of new grounds of rejection.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Abul Kalam whose telephone number is (571)272-8346. The examiner can normally be reached on Monday - Friday, 9 AM - 5 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael M. Fahmy can be reached on 571-272-1705. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/A. K./
Examiner, Art Unit 2814

/Phat X. Cao/
Primary Examiner, Art Unit 2814